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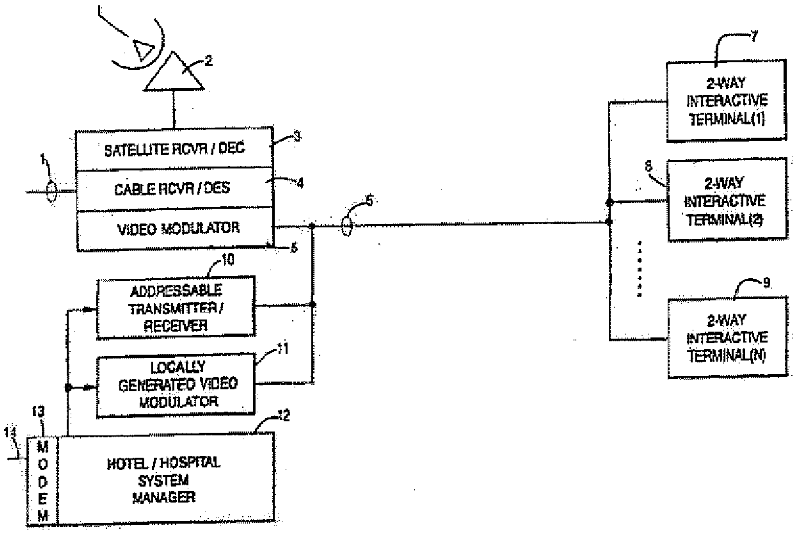
2
3
SATELLITE RCVR / DEC
1
CABLE RCVR / DES
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VIDEO MODULATOR
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ADDRESSABLE TRANSMITTER / RECEIVER
11
LOCALLY GENERATED VIDEO MODULATOR
13
12
14
MODEM
HOTEL / HOSPITAL SYSTEM MANAGER
7
2-WAY INTERACTIVE TERMINAL(1)
8
2-WAY INTERACTIVE TERMINAL(2)
9
2-WAY INTERACTIVE TERMINAL(N)

(57) Abstract

A two-ray interactive addressable entertainment terminal comprises a processor, a keyboard, a character generator responsive to the processor and memory for storage of an algorithm related to the installation of the terminal and to providing a verification indication at the terminal of acknowledged entry of the terminal into an entertainment system. The character generator, responsive to the passage of a predetermined period of time since the application of power to the terminal, causes a number of screens to be displayed on an associated television receiver. The display screens reinforce the algorithm and provide indications of programmed key functions despite labels of keys on the keyboard. Consequently, a user or installer is capable of installing a terminal according to the present invention without any communication with personnel at the location of a system manager. By requiring the practically simultaneous occurence of two events the application of power and the actuation of a predetermined key, inadvertent entry into either an installation mode or a maintenance mode of terminal operation is prevented.

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AUTOMATIC INTERACTIVE TELEVISION
TERMINAL CONFIGURATION

BACKGROUND OF THE INVENTION

1. Technical Field

This invention primarily relates to the field of two way interactive entertainment systems typically provided over cable facilities to a user and, more particularly, to a method and apparatus enabling automatic configuration of a television terminal and of its association with a television receiver.

2. Description of the Relevant Art

Two way interactive cable television systems are known for transmitting entertainment, information and data signals over a cable facility toward a plurality of users. Data may be transmitted and addressed to a particular subscriber over a separate data channel or a so-called "in-band" data channel. In a downstream direction, addressed control data may represent services authorized to a particular terminal or control commands to that terminal. In an upstream direction from a terminal to the service provider or system manager location, control data may represent selections made by a user in response to a polling request or at the time of user selection.

Terminals are often manufactured with stored unique identification numbers which may be unknown to a user for security purposes. Nevertheless, the unique identification number is necessary for the system manager to enter a terminal into a system along with location related information and configuration information. When service is ordered, an installer may be dispatched to an installation location with a terminal but, in the past, has not been able to align a screen display of an associated television receiver without having to obtain access to the interior of the terminal. Further, the installer has not been able to actuate entry of the terminal into the entertainment system without the assistance of personnel at the system manager location. Further still, the installer has been unable to immediately and automatically verify entry of the terminal into the system.

In a hotel/hospital environment, considerable interaction between an installer and the system manager location may be required to accomplish terminal configuration. In fact, the installer may be required to travel between the locations of the terminal and of the system manager until terminal entry into the system is acknowledged.

No provision has been made in the past for the possibility that a user may purchase their own terminal and configure the terminal themselves. The user is dependent on installer installation processes.

The installer or user, then, to configure a terminal should be able to assure themselves that the individual components of the terminal are functioning properly. They should assure themselves that any software is handling tasks in a responsible, efficient manner. The association of the terminal with the terminal receiver should be verified in at least two ways. Firstly, each television receiver may react differently to commands to display a teletext screen of information. Consequently, there may be a requirement to align the display of a test screen on the television receiver. Secondly, the turning off of power to a television receiver may be inappropriate for a particular television receiver installation. Consequently, if power is supplied to the television receiver via the terminal, it may be appropriate to set a switched power outlet of the terminal to either a permanently ON or to a switched condition in which power is provided to the receiver only when the terminal is turned on. System entry is determined by, at least, the acceptance by a system manager of the unique terminal identification and, possibly, a secondary identification of the terminal and/or the user. Typically, a separate telephone communication is required for the user or installer to verify system entry.

Interactive terminals generally have been equipped without the capability of locally generating a display on an associated television receiver. Terminal-provided displays such as liquid crystal displays of a selected channel number at a terminal are inadequate for providing an effective man/machine interface for accomplishing a complicated task such as terminal configuration. Supplementing any such display with an installation manual may still be inadequate and confuse the user or installer.

Keys normally provided at interactive terminals comprise a complement of numeric input keys, channel increment keys, volume control keys, a power button and a "buy" key. However, these keys are inappropriately labeled and may confuse the user if simultaneously employed for terminal configuration.

It is also known in the art of non-interactive cable television terminals having a programmable read only memory to enable a remote programming of the terminal via inputting a special code not provided with the standard remote control transmitter associated with the terminal. According to U.S. Patent No. 4,792,972, which issued December 20, 1988, entitled "Remote Programming of a CATV Channel Authorization Unit" and incorporated herein by reference, an installer employs a special programming unit equipped with, for example, an infrared transmitter to remotely program the read only memory of a so-called "plain Jane" converter, which is not addressable over a communications link by a system manager, nor is the converter capable of return transmissions. Via the special code, access is obtained to the read only memory into which memory is loaded premium channels and services authorization data. The converter is not equipped with a character generator and has no capability to locally generate character screens for display on an associated television receiver. All activities are controlled from the special code transmitting remote programming unit.

Consequently, there remains a requirement in the art for providing an interactive television terminal and method of enabling an automatic installation of the terminal comprising, for example, screen alignment, terminal configuration, or the acknowledgement of entry into an interactive entertainment system.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an interactive terminal capable of automatic configuration.

It is a further object of the present invention to provide an automatically configurable terminal that is user friendly.

It is a still further object of the present invention to provide an automatically configurable, user friendly terminal which guides the user through the steps of screen alignment, terminal configuration and system entry verification.

The problems and related deficiencies of prior art interactive entertainment terminals are solved by the principles underlying a terminal according to the present invention comprising a processor, associated memory for storing an algorithm related to initial terminal installation, a character generator responsive to processor control, a keypad or remote control for inputting information to the processor for processing and a power supply input. Once power is applied to the terminal, the processor enters an initialization mode in which proper operation of terminal components and software algorithms is verified. During initialization and within a predetermined period of time since power application, if a certain key is actuated, the microprocessor enters an installation mode of operation. During the installation mode of operation, the character generator responsive to processor control generates at least one character screen on a display of an associated television receiver. The character screen is stored in permanent memory of the terminal and is not dependent on system manager transmission of screen contents to the terminal for storage. The screen may relate to screen alignment, terminal configuration or system manager or terminal status.

Screen alignment relates to the problem that a particular television receiver may behave differently dependent on the format of a teletext screen presented to the receiver for display. Consequently, a test screen may be aligned according to the present invention by actuating keys identified on the display up or down and to the right or left. These are functions unrelated to the labels of the keys. However, by displaying the functions on the displayed test screen for alignment, a user or installer is encouraged to actuate them despite their labeling. Consequently, screen alignment is made user friendly.

In a similar manner, terminal features may be configured by a second screen and terminal location related information such as user or location specific data may be entered. Terminal features may include, for example, the interlaced or non-interlaced character of the display or the status of a switched power outlet of the terminal.

A system manager will globally call for responses periodically from previously unconfigured terminals. A third screen may provide an indication to the user of system manager status as well as whether the system manager has acknowledged entry of a previously unconfigured terminal into the system.

These and other features of the present invention will become evident from the following detailed description of the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block schematic diagram of an interactive entertainment system in accordance with the present invention applied in a hotel or hospital system environment comprising automatically configurable, 2-way interactive terminals;

Figure 2 is a block schematic diagram of a 2-way interactive terminal according to the present invention comprising a microprocessor, a memory, a character generator, a keypad and a television signal output to an associated television receiver;

Figure 3 is a collection of four exemplary screens, three of which according to Figure 3(a), (b) and (c) are for display on a television receiver associated with the terminal of Figure 2 during an automatic installation mode of operation of the terminal and the fourth, according to Figure 3(d), is for display during a terminal maintenance mode.

Figure 4 is a flowchart of an algorithm of terminal software for accomplishing an automatic installation mode of operation or similarly implemented manufacturing or maintenance modes of operation.

Figure 5 is a detailed flowchart of processor operation related to screen alignment.

Figure 6 is a detailed flowchart of processor operation related to terminal configuration.

Figure 7 is a detailed flowchart of processor operation related to system status and acknowledgement of system entry.

DETAILED DESCRIPTION

Referring to Figure 1, there is shown a block schematic diagram of an interactive entertainment system in accordance with the present invention. The depicted embodiment relates to its application in a hotel or hospital system environment; however, the present invention is not so limited. The present invention may also be applied in any two-way interactive entertainment system such as a cable or satellite television entertainment system involving a distribution network comprising trunk lines and feeder cables of optical or coaxial cable. For example, satellite receiver and decoder 3, cable receiver and descrambler 4, video modulator 5, addressable transmitter receiver 10, locally generated video modulator 11, and system manager 12 may all be located at the location of a cable television system head end. In this example, coaxial cable or optical fiber link 6 can connect the cable television head end to two-way interactive terminals 7, 8 or 9 of the entertainment system located at individual subscriber premises.

On the other hand, the embodiment of Figure 1 is especially exemplary of the application of the present invention in a hotel or hospital entertainment system. Transmission link 6, then, may simply comprise a coaxial or optical fiber cable link between an entertainment control center and N terminals, for example, terminals 7, 8 or 9 located in rooms of the facility.

In particular, at the entertainment system control center, a satellite signal may be received at satellite antenna 2 and then received and decoded at satellite receiver decoder 3 for distribution via modulator 5 over a distribution cable 6 to the interactive terminals 7, 8 or 9 of the present invention. Additionally, a band of cable television channels received over cable facilities 1 are received and, if necessary, descrambled at cable receiver/descrambler 4. The descrambled video signals are then modulated at modulator 5 for distribution over facilities 6 to interactive terminals 7, 8 or 9. If desired, an optional scrambler may be provided for scrambling premium channel transmissions to interactive terminals 7, 8, or 9. Of course, terminal 7, 8, or 9, then, would comprise descrambler circuitry capable of descrambling the scrambled premium channel transmissions. Such circuitry is not shown in either Figure 1 or 2 but would be preferable in a system involving distribution of signals to remote subscriber locations.

According to the exemplary embodiment of Figure 1, the hotel or hospital location may be connected to other hotels or hospitals via data link 14. Over data link 14, data may be received via modem 13 at system manager 12. In this manner, the hotel or hospital system manager may maintain current status of all features and all interactive terminals of an entertainment system comprising a plurality of hotels. For example, entertainment schedules may be distributed over the data transmission link from a network control center where the entertainment schedule is composed. System manager 12 comprises a data processing unit and appropriate memory for storing status and features associated with all terminals in the system. System manager 12 also controls the generation of video channels at modulator 11, if necessary, for transmission over facility 6 to the two-way interactive terminals 7, 8 or 9. In particular, modulator 11 comprises the capability to generate signals for actuating the display of character screens at terminal locations responsive to the control of the system manager 12 in the event, for example, that terminals are unable to generate the character screens themselves.

The generation of complete screens of characters for transmission to a terminal according to the present invention for display is not required because the terminal (Figure 2) comprises its own character generator 204. Consequently, locally generated video modulator 11 is optional. Instead, system manager 12 generates commands to generate screens, and not the screens themselves, for transmission via addressable transmitter 10 to an interactive terminal according to the present invention. In a "hybrid" system comprising terminals having no character generator and terminals according to the present invention, locally generated video modulator 11 would be necessary. The screens generated either at the terminal or by way of modulator 11, for example, may relate to the provision of information to guests or patients about hotel or hospital services, respectively.

Also according to Figure 1, system manager 12 controls an addressable transmitter/receiver 10 for transmitting addressed communications which are uniquely addressed to terminals 7, 8 or 9 and receiving communications at random times or in response to polling requests of terminals. The addressable transmitter 10 according to Figure 1 may transmit addressed information on a separate data carrier, for example, at 108 megahertz and receive information transmitted in a so-called upstream direction from the terminals on another separate data channel at 25 megahertz. In an alternative embodiment, all downstream communications may be transmitted in band or within a particular television channel transmission, for example, within the horizontal or vertical intervals of transmitted video signals. Consequently, the system manager 12 accomplishes in band signaling by controlling data input into the video signals transmitted via either modulators 5 or 11 (not shown). A separate data carrier for each direction of transmission may be preferred due to the increased data carrying capacity. For upstream transmission, a telephone line or spread spectrum transmission may be employed as an alternative to a separate data channel.

Besides specifically addressed data communications with the interactive terminals 7, 8 or 9, the system manager may also address communications globally to all interactive terminals which communications may or may not require a terminal to respond. Such global communications, for example, may be addressed to a global address representing all terminals in the particular hotel system or to a group address representing a group of terminals within the system having a commonality of interest.

The problem solved by the present invention relates to the facilitation of the installation of a new interactive terminal 7, 8 or 9 into the system. According to the present invention, either the user of a terminal or an installer may install their terminal and so configure the terminal themselves. Interactive terminals 7, 8 or 9 are, consequently, equipped with means for enabling automatic installation according to Figure 2.

Referring to Figure 2, there is shown a two-way interactive terminal according to the present invention. The terminal is coupled via facility 6 to video modulator 5, addressable transmitter/receiver 10, and locally generated video modulator 11, if provided, as shown in Figure 1.

In particular, a two-way interactive terminal according to the present invention comprises an up/down converter 201 for converting channels received over the facility 6 for display at an associated television receiver (not shown) or for transmitting data modulated to 25 megahertz by data transmitter 203 for transmission over facility 6. Up/down converter 201 passes data on the separate data carrier at 108 megahertz for demodulation and reception at data receiver 203. Received television entertainment signals are provided by up/down converter 201 to demodulator 202 which also provides automatic frequency control and gain control of up/down converter 201. Demodulator 202 provides video via on screen character generator 204 to channel 3/4 modulator 205. In this manner, on screen character generation may appear superimposed upon an incoming video signal or displayed in the form of a teletext screen, for example, text on a plain colored background. Also at demodulator 202 the baseband audio channel is transmitted to audio output 211 or via channel modulator 205 to the television receiver at radio frequency. In addition, a baseband video output 213 may be provided from on screen character generator 204 at video output jack 213.

The interactive terminal of the present invention further comprises a processor 206 for controlling data transmission and reception at data receiver/transmitter 203. Processor 206 also controls character generation at character generator 204 via gate array 207. Also via gate array 207, the processor 206 controls a key pad 216 which may be directly coupled to the gate array or coupled via infrared or other remote control transmission link receiver 208. Random access memory (RAM) 217, provided with backup power by capacitor 218, stores character screen commands, downloaded feature data and other data received over the data transmission link via data receiver 203 from the system manager responsive to processor 206 control. The processor 206 also has access to a nonvolatile random access memory 222 and access via gate array 207 to an outboard read only memory (ROM) 219. Processor 206 receives remote control key commands from a remote control key pad via infrared or other remote control transmission receiver 208. Processor 206 may also control the operation of a phase lock loop 209 and bandpass filter 210 for controlling operation of the up/down converter 201.

Power is supplied via an alternating current input to power supply 215 which provides, for example, a plus 5 volt and a plus 12 volt DC input to various components of the terminal requiring such power. Furthermore, the alternating current power input to power supply 215 may be provided via a controlled switched outlet 214 to an associated device such as the television receiver associated with the terminal. The state of the switched outlet 214 is controlled via gate array 207 by processor 206. For example, the switched outlet 214 may continuously provide power to its associated device or provide power only when an "on" button of key pad 216 or a remote control key pad is set to an on condition.

Values inside of boxes or associated with boxes are exemplary of memory sizes, clock rates, or component types. For example, clock 220 for clocking the microprocessor operation may operate at 14.318 megahertz. The clock signal is divided down by gate array 207 for operation of the microprocessor 206 which may be a Motorola MC 6803U4 or for clocking other processes of the terminal. The on screen character generator 204, for example, may be a Mitsubishi M50455 component. RAM 217 may comprise 16 kilobytes of memory and ROM 219 comprise 32 kilobytes of memory respectively.

In addition to character generation and screen display, LEDs 221 may, for example, indicate at least a power on condition or, additionally, an alternative display of tuned channel number or other data which may be displayed on a screen.

Referring now to Figures 3 and 4, the operation of the present terminal of Figure 2 will be described especially in regard to the flowchart provided by Figure 4. Copyright protection is asserted for each of screens Fig.'s 3(a) - 3(d) and for the flowchart of Fig. 4. Once the user of the terminal or an installer applies power to the power supply 215 of Figure 2 and in accordance with application of power application box 401 of Figure 4, processor 206 begins the task of initialization of various hardware components of the terminal of Figure 2. Such hardware initialization routines according to box 402 of Figure 4 may be any such initialization routines applied in the art of terminal initialization such as those applied in data terminal initialization. Processor 206 assures proper operation and communication and control of components of the terminal such as data transmitter and receiver 203, gate array 207, on screen character generator 204, key pad 216, and infrared remote control receiver 208. According to box 403, the software may perform self-inflicted diagnostic routines well known in the art to verify proper software operations. From box 403 the processor may enter an optional manufacturing or factory testing mode 403a which will be discussed subsequently. It may also enter a maintenance or display RAM mode of operation represented by boxes 404-405 which will also be discussed subsequently, but which mode of operation is dependent on the particular depression of a predetermined key of keyboard 216 or the receipt of data entered via remote control receiver 208.

The present invention relates primarily to the actuation of a different predetermined key of key pad 216 or infra red remote control 208 within a predetermined period of time after the application of power at box 401. The predetermined period of time may be only the duration of reaching box 406 since power application and so appear to the user as if the application of power and display of a first installation mode screen are practically simultaneous, i.e., within a second or two of one another. The actuation of the "1" key, for example, is represented by box 406. If the one key has been depressed within a predetermined time after the application of power at box

401, a first display screen "1" is generated at box 407 via on screen character generator 204.

Display screen "1" relates to screen alignment test screen, Figure 3(a). This display screen along with display screens, Figures 3(b) and 3(c), actuated via boxes 409 and 410, respectively, are stored in either read only memory of processor 206, read only memory 21 or nonvolatile RAM 222. Consequently, these screens are not dependent upon the system manager of Figure 1 in any way. Also, because the entry into an installation mode is dependent on two normally unperformed tasks such as plugging in power and the practically simultaneous depression of a particular key, the installation mode is protected from inadvertent actuation.

Alternatively, box 406 may be supplemented by a decision box (not shown) asking if this is the first application of power. If yes, then box 407 is entered. If no, then a box such as existing box 406 requiring a "1" key depression is entered. Such an entry into the installation mode may facilitate installation without jeopardizing security as such a supplemental box would typically only be entered once in the life of a terminal.

Referring first to Figure 3(a), there is shown a first display screen which comprises a test screen for an alignment of the display of an associated television receiver. As all television receivers do not handle the display of teletext screens in the same way, screen alignment is often necessary. According to Figure 3(a), outer perimeter 301 represents the boundaries of a screen display of the associated television receiver. A box of asterisks 302 represents the boundaries of the test screen for testing alignment. A terminal user or installer follows the commands provided by test screen 302 to effectuate a proper screen alignment. Processor 206 may be scanning key pad 216 or receiving input commands entered via infrared remote receiver 208. Processor 206 will ignore any inputs besides those depicted in Figure 3(a). For example, to align the screen display up or down, the user or installer will depress the channel increment or decrement key respectively. Furthermore, to align the screen display to the right or to the left, the user or installer will depress either the volume increase or decrease key respectively. To save the particular screen alignment selected, the user or installer depresses a "BUY" key and the next screen is displayed. Otherwise, if the "NO" key is depressed before the "BUY" key, the previous screen alignment or default screen alignment setting will be saved. Actuating the "NO" key takes the user to the next screen shown in Figure 3b. Step 408 of the flowchart of Figure 4 represents screen alignment as described above whereby either a default or previously saved setting of screen alignment or a newly input screen alignment is saved in terminal memory. Optionally, a time out means may be provided whereby, if no action is taken, either the installation mode is quit or the next screen is displayed.

At box 409, a second screen of terminal configuration is displayed, screen 2. Screen 2 for terminal configuration is shown in Figure 3(b). According to Figure 3(b), a room name is requested as well as instructions from the user or installer as to whether the switched AC outlet 214 should be switched or placed in a permanently on condition. "Interlace:" is a request for input from the user or the installer as to whether teletext screens should be interlaced or non-interlaced. While non-interlaced is preferred, excessive screen bounce exhibited by the television receiver may require the display to be interlaced. However, non-interlaced screens generally exhibit little, if any, screen bounce compared with interlaced screen display.

The screen of Figure 3(b) also may show the permanent unique identification number of the terminal, in this example, 123ABCO. If a user is to install a terminal and to secure the terminal's identity from piracy by the user of premium services, it may not be appropriate to display the unique terminal identification number. Also, in a user installation environment, the room name may be insufficient to uniquely identify the user's location and other information must be entered related to the location of the terminal. For example, in such a scenario, the user's name, address and credit information, i.e., credit card data, may be requested by this screen. Furthermore, the "interlace request" may require explanation to an unsophisticated user besides that provided by Figure 3(b).

It should be noted that by assigning new functions to existing keys CH+, CH-, Vol+, Vol-, BUY, etc., the present invention permits programmable assignment of functions to keys which may have little or no relationship to the key labeling. Furthermore, by reinforcing the assigned key function by means of a screen display, a user or installer may feel comfortable with their selection of a particular key for performing a non-indicated function. In other words, the combination of screen display and programmable keys creates a human friendly interface between the user or the installer and the terminal.

Returning now to Figure 3(b), "Room Name:" requests the entry of a non-zero room identifier. The system manager may be programmed to refuse acceptance of a room name comprising all zeros. Consequently, a terminal reporting a room name of all zeros will be denied entry into the system. The room name is entered by depressing numeric keys one at a time until the number is shifted into the seven indicated positions from right to left. Actuating the "BUY" key will save the displayed terminal configuration and actuate display of the next screen. Actuating the "NO" key will preserve the existing status and enter the next screen, Figure 3(c). If an invalid name has been entered, the "BUY" key will be ignored. A time out, if provided, will actuate the next screen or quit the installation mode.

Referring now to Figure 3(c), a system manager, according to Figure 1, may be in the process of polling a terminal, i.e. requesting or accepting transmissions from the terminal or configuring the terminal by transmitting, for example, channel assignments, screen generation commands, and/or features to the terminal for storage in memory. The "Sysmgr Status", then, is either "POLLING" or "CONFIGURING" when the system manager is active. If the system manager is down or is not communicating with the terminal for any reason, the "Sysmgr Status" is indicated as "INACTIVE." If either "POLLING" or "CONFIGURING" are displayed, the user or installer at least knows that the system manager is transmitting to the terminal.

The status of the terminal is either UNCONFIRMED or ACKNOWLEDGED. Typically, in a global command related to initial system entry, a system manager requests a newly installed terminal to transmit at least their identification and location name. If the system manager recognizes a previously unconfigured terminal or a new name not previously entered in the system, the system manager enters the new name into its memory along with configured features such as the status of the switched power outlet 214.

The third screen according to Figure 3(c) is only to provide a visual indication to the user or the installer of system manager and terminal status. The processor 206 and system manager will interact, upon initial installation, regardless of whether the third screen is displayed until the terminal is entered into the system and the terminal entry is acknowledged if a valid room name or related data has been entered. The actuation of any keyboard key will quit the installation mode.

In an alternative embodiment, all three screens may comprise one screen provided the screen does not become too "busy" to be user friendly. For example, with the advent of high definition television and wider screens, it may be possible to condense the number of screens employed for an installation mode of terminal operation.

In an alternative embodiment, a time out may be associated with each screen such that, if no keys are depressed, the installation mode is eventually quit and no actions taken if no room name is entered.

Referring again to Figure 4, at box 404, it may be possible to implement a "maintenance mode" of operation comprising boxes 404 and 405, for example, if desired, in a similar manner to the implementation of the "installation mode" of boxes 406-410. Instead of depressing the "1" key within a predetermined period of time, a "BUY" key actuation may be recognized within a predetermined period of time after the application of power and at some point after software initialization has at least begun at box 403. If the "BUY" key is depressed within a predetermined period of time since power application, a screen such as the screen of Figure 3(d) may be displayed for showing memory status. One can page through the memory by depressing CH+ or CH- and may toggle from hexadecimal to ASCII format by depressing another key, for example, the "OK" key.

Furthermore, in a manner similar to that mode of access described by U.S. Patent No. 4,792,972 which issued December 20, 1988, and according to box 403a a factory testing or "mftr" mode of operation may be entered by entry of a special code via the infrared remote link receiver 208. In actuality, box 403a need not be located as shown as there is no required relationship between box 403a, initialization and the application of power. It may be entered at any time the special code is received, for example, during a normal mode of operation according to box 411. This special code, for example, may not be one that is generatable by either the terminal keypad 216 or an infrared transmitter normally provided with the terminal. In this way, only factory personnel may enter the factory mode unless, for example, an installer or user is provided with a special transmitter which can generate the special code.

Referring now to Figures 5-7, the installation mode of operation of a terminal according to the present invention will be demonstrated in still greater detail. Copyright protection is asserted for each of flowcharts Fig.'s 5-7. Figure 5 relates to steps 407 and 408 of Figure 4 and test screen "1" of Figure 3(a). Consequently, box 501 is entered from box 406 of Figure 4 after a predetermined period of time has lapsed until the actuation of a "1" key measured by the duration of accomplishing initialization routines or directly after initialization if this is the first application of power to the terminal. Other means for accomplishing a predetermined period of time may include the use of clock 220 to obtain a predetermined count since power application. At box 502, test screen "1" is displayed in a position according to a default screen alignment position or a previously stored position. Boxes 503-510 relate to the incremental movement of the test screen by one unit, for example, one horizontal or vertical line, up or down, to the right or to the left.

If at box 511, the "buy" key is depressed, then, the new screen alignment is stored. If not, and the "No" key is actuated at box 513, the previous screen alignment is stored at box 514. Also, if a certain period of time has elapsed with no activity at box 515, the previous screen may be stored at box 516. The next screen, screen "2" of

Figure 3(b), is entered at box 517 having saved either the previous screen alignment or a newly entered screen alignment.

Referring now to Figure 6, box 601 is entered from box 517 of Figure 5. The screen according to Figure 3(b) is displayed at box 602 and, optionally, so is the secret terminal identification number. Boxes 603-606 relate to configuring the status of the switched outlet 214 and to the interlaced or non-interlaced character of the display.

Any number key at box 607 will actuate a shifting to the left of numbers already entered in the room name field of Figure 3(b). If a credit card number or other personal information is required of a user, then, another key may toggle to numeric entry of a credit card choice and then to a credit card number or to entry of any other number or item selection according to other screens (not shown). The depicted keyboard 216 is not equipped with alphabetic keys and comprises only eighteen or twenty-two keys of the required twenty-six. However, means are known for alphabetic entry of characters from a limited capacity keyboard which may be employed or the keyboard may be expanded by four keys if alphabetic input is required.

If a non-zero room name is entered at box 607, then, system entry can be obtained for a terminal via a path comprising boxes 609, 611, 612, 613 and 614. Otherwise, if the room name is invalid at box 611 and there has been no time out at box 610, the terminal will remain in a loop in which it will refuse to recognize a "BUY" key. If the "NO" key is actuated at box 609 or if there has occurred a time out at box 610, previously entered values are stored and the next screen extended at box 616. If, on the other hand, a valid room name has been entered at box 611 and the "Buy" key has been actuated at box 612, then the room name and the terminal configuration are stored at box 613 and the next screen entered at box 614.

Referring now to Figure 7, screen 3 according to Figure 3(c) is displayed showing the current status of the system manager and the terminal. Boxes 702-705 relate to display of the current status of the system manager. Boxes 706-708 relate to display of the current status of entry of the terminal into the system. Any key actuation at box

709 actuates a quitting of the installation mode at box 711 or a time out may be implemented according to box 710.

CLAIMS

1. A two-way interactive entertainment terminal for communicating with a system manager of an entertainment system, the terminal comprising:

a transmission link for communicating via a media with the system manager,

a processor for processing data,

memory associated with the processor,

a character generator, responsive to the processor, for generating characters for display on a display screen,

a keypad for inputting information to the terminal, the input information for processing by the processor,

a power input,

the terminal, responsive to the application of power at the power input, entering an initialization mode,

the processor, during the initialization mode, verifying proper operation of terminal components and software,

the terminal, during initialization, entering an automatic installation mode,

the character generator, responsive to the processor, for generating at least one display screen of characters requiring keyboard response, the required response being related to terminal installation,

the terminal, recognizing an appropriate response, configuring itself according to the response prior to entry of the terminal into the entertainment system.

2. A terminal according to claim 1, the at least one display screen generated by the character generator being related to alignment of a test screen on the display of an associated television receiver.

3. A terminal according to claim 1, the at least one display screen generated by the character generator for requesting terminal location information input.

4. A terminal according to claim 1, the at least one display screen generated by the character generator for requesting input as

to the interlaced or a non-interlaced character of character screen display.

5. A terminal according to claim 1 further comprising a switched power output, the at least one display screen generated by the character generator for requesting input as to the provision of power to an associated device.

6. A terminal according to claim 3, the at least one display screen for indicating acknowledgement of terminal entry into the system by the system manager.

7. A terminal according to claim 1, one display screen generated by the character generator being related to alignment of a test screen on the display of an associated television receiver, a second display screen for requesting terminal location information input and a third display screen for indicating acknowledgement of terminal entry into the system by the system manager.

8. A terminal according to claim 1, the terminal, responsive to the actuation of a predetermined key of the keypad, entering a maintenance mode,

the character generator, responsive to the recognition of the predetermined key, for generating at least one display screen of characters related to terminal maintenance.

9. A terminal according to claim 8, the terminal maintenance display screen for displaying memory contents.

10. A terminal according to claim 9, the terminal maintenance display screen for displaying memory contents in hexadecimal format.

11. A terminal according to claim 9, the terminal maintenance display screen for displaying memory contents in ASCII format.

12. A terminal according to claim 9, the terminal maintenance display screen being adaptable for the display of memory contents in a particular format.

13. A terminal according to claim 1, the keypad being either for remote control of the terminal or directly coupled to the terminal.

14. A terminal according to claim 13, the at least one display screen generated by the character generator being related to terminal testing during manufacture.

15. A terminal according to claim 13 comprising a remote control command receiver, the processor recognizing the actuation of at least one predetermined key, the key being one not normally provided on either the remote control keypad or the directly coupled keypad for transmitting a predetermined control code to the remote control command receiver of the terminal.

16. A two-way interactive entertainment terminal comprising a data processor, a memory associated with the data processor, a keypad for imputing data to the data processor, and a character generator, responsive to the data processor, for generating characters for display on a display screen, the terminal, responsive to the application of power to the terminal, entering an initialization mode, during which mode, the microprocessor, responsive to the actuation of at least one predetermined key, controlling the character generator for generating at least one display screen related to screen alignment, terminal configuration or verification of entry into an entertainment system.

17. A terminal according to claim 16, the keypad comprising keys having programmable functions such that the keys have different functions depending on processor status, a present key function being displayed on the at least one display screen.

18. In a two-way interactive entertainment terminal comprising a data processor, a memory associated with the data processor, a keypad for inputting data to the data processor, and a character generator, responsive to the data processor, for generating characters for display on a display screen, a method of enabling an automatic installation of the terminal for entry into an entertainment system comprising the steps of:

applying power to the terminal,

initializing operation of terminal components responsive to the application of power to the terminal, actuating a display of at least one screen of characters, the display screen requiring keypad response,

recognizing an appropriate keypad response to the display screen, and

configuring the terminal according to the response prior to entry of the terminal into the entertainment system.

19. An automatic terminal installation method according to claim 18, comprising the additional step of recognizing the actuation of:

recognizing the actuation of a predetermined key of the keypad during initialization within a predetermined period of time from the application of power to the terminal.

20. An automatic terminal installation method according to claim 18, the method comprising the additional steps of

recognizing an actuation of a different predetermined key and

quitting automatic terminal installation responsive to recognizing the actuation of the different predetermined key.

21. An automatic terminal installation method according to claim 18 further comprising the step of:

providing an indication of acknowledgement of entry of the terminal into the system.

22. An automatic terminal installation method according to claim 18 wherein the keyboard response may comprise a plurality of responses including at least the entry of information related to terminal location.

23. An automatic terminal installation method according to claim 21 wherein the acknowledgment indication is conditional upon the entry of valid information via the keypad.

24. An automatic terminal installation method according to claim 23 wherein the keypad entered information relates to terminal location.

AMENDED CLAIMS

[received by the International Bureau
on 21 June 1990 (21.06.90);
original claims 1-24 replaced by amended claims 1-27
(7 pages)]

1. A two-way interactive cable television entertainment terminal for communicating with a system manager of an entertainment system, the terminal comprising:

an analog transmission link for communicating via a radio frequency transmission media with the system manager,

a processor for processing data,

memory associated with the processor,

a character generator, responsive to the processor, for generating characters for display on a display screen,

a keypad for inputting information to the terminal, the input information for processing by the processor,

a power input,

the terminal, responsive to the application of power at the power input, entering an initialization mode,

the processor, during the initialization mode, verifying proper operation of terminal components and software,

the terminal, during initialization, entering an automatic installation mode,

the character generator, responsive to the processor, for generating at least one display screen of characters requiring keyboard response, the required response being related to terminal installation,

the terminal, recognizing an appropriate response, configuring itself according to the response prior to entry of the terminal into the entertainment system.

2. A terminal according to claim 1, the at least one display screen of characters generated by the character generator being related to alignment of a test screen on the display of an associated television receiver.

3. A terminal according to claim 1, the at least one display screen of characters generated by the character generator for requesting terminal location information input.

4. A terminal according to claim 1, the at least one display screen of characters generated by the character generator for

requesting input as to the interlaced or a non-interlaced character of the character screen display.

5. A terminal according to claim 1 further comprising a switched power output, the at least one display screen generated by the character generator for requesting input as to the provision of power to an associated device.

6. A terminal according to claim 3 further comprising a second screen of characters for indicating acknowledgment of terminal entry into the system by the system manager.

7. A terminal according to claim 1, a first display screen of characters generated by the character generator being related to alignment of a test screen on the display of an associated television receiver, a second display screen of characters for requesting terminal location information input and a third display screen of characters for indicating acknowledgment of terminal entry into the system by the system manager.

8. A terminal according to claim 1, the terminal, responsive to the actuation of a predetermined key of the keypad, entering a maintenance mode,

the character generator, responsive to the recognition of the actuation of the predetermined key, for generating at least one display screen of characters related to the terminal maintenance mode.

9. A terminal according to claim 8, the at least one terminal maintenance mode display screen for displaying memory contents.

10. A terminal according to claim 9, the at least one terminal maintenance mode display screen for displaying memory contents in hexadecimal format.

11. A terminal according to claim 9, the at least one terminal maintenance mode display screen for displaying memory contents in ASCII format.

12. A terminal according to claim 9, the terminal at least one maintenance mode display screen being adaptable for the display of memory contents in a particular format.

13. A terminal according to claim 1, the keypad being either for remote control of the terminal or directly coupled to the terminal.

14. A terminal according to claim 13, the at least one display screen of characters generated by the character generator being related to terminal testing during manufacture.

15. A terminal according to claim 14 comprising a remote control command receiver, the processor recognizing the actuation of at least one predetermined key, the key being one not normally provided on either the remote control keypad or the directly coupled keypad for transmitting a predetermined control code to the remote control command receiver of the terminal, the predetermined control code being related to terminal testing during manufacture.

16. A two-way interactive cable television entertainment terminal comprising a data processor, a memory associated with the data processor, a keypad for inputting data to the data processor, and a character generator, responsive to the data processor, for generating characters for display on a display screen, the terminal, responsive to the application of power to the terminal, entering an initialization mode, during which mode, the microprocessor, responsive to the actuation of at least one predetermined key, controlling the character generator for generating more than one display screen related to screen alignment, terminal configuration and verification of entry into an entertainment system.

17. A terminal according to claim 16, the keypad comprising keys having programmable functions such that the keys have different functions depending on processor status, a present key function being displayed on the at least one display screen.

18. In a two-way interactive cable television entertainment terminal comprising a data processor, a memory associated with the data processor, a keypad for inputting data to the data processor, and a character generator, responsive to the data processor, for generating characters for display on a display screen, a method of enabling an automatic installation of the terminal for entry into an entertainment system comprising the steps of:

applying power to the terminal,

initializing operation of terminal components responsive to the application of power to the terminal,

actuating a display of at least one screen of characters, the display screen requiring keypad response,

recognizing an appropriate keypad response to the display screen, and

configuring the terminal according to the response prior to entry of the terminal into the entertainment system.

19. An automatic terminal installation method according to claim 18, comprising the additional step of:

recognizing the actuation of a predetermined key of the keypad during initialization within a predetermined period of time from the application of power to the terminal.

20. An automatic terminal installation method according to claim 18, the method comprising the additional steps of

recognizing an actuation of a different predetermined key and

quitting automatic terminal installation responsive to recognizing the actuation of the different predetermined key.

21. An automatic terminal installation method according to claim 18 further comprising the step of:

providing an indication of acknowledgment of entry of the terminal into the system.

22. An automatic terminal installation method according to claim 18 wherein the keyboard response may comprise a plurality of responses including at least the entry of information related to terminal location.

23. An automatic terminal installation method according to claim 21 wherein the acknowledgment indication is conditional upon the entry of valid information via the keypad.

24. An automatic terminal installation method according to claim 23 wherein the keypad entered information relates to terminal location.

25. A two-way interactive entertainment terminal for communicating with a system manager of an entertainment system, the terminal comprising:

a transmission link for communicating via a media with the system manager,

a processor for processing data,

memory associated with the processor,

a character generator, responsive to the processor, for generating characters for display on a display screen,

a keypad for inputting information to the terminal, the input information for processing by the processor,

a power input,

a switched power output,

the terminal, responsive to the application of power at the power input, entering an initialization mode,

the processor, during the initialization mode, verifying proper operation of terminal components and software,

the terminal, during the initialization mode, entering an automatic installation mode,

the character generator, responsive to the processor, for generating at least one display screen of characters requiring keyboard response, the required response being related to terminal installation,

the terminal, recognizing an appropriate response, configuring itself according to the response prior to entry of the terminal into the entertainment system,

the at least one display screen of characters generated by the character generator further includes a screen of characters for requesting input as to the provision of power to an associated device.

26. A two-way interactive cable television entertainment terminal for communicating with a system manager of an entertainment system, the terminal comprising:

an analog transmission link for communicating via a radio frequency transmission media with the system manager.

a processor for processing data,

memory associated with the processor,

a character generator, responsive to the processor, for generating characters for display on a display screen,

a keypad for inputting information to the terminal, the input information for processing by the processor,

a power input,

the terminal, responsive to the application of power at the power input, entering an initialization mode,

the processor, during the initialization mode, verifying proper operation of terminal components and software,

the terminal, during initialization, entering an automatic installation mode,

the character generator, responsive to the processor, for generating at least one display screen of characters requiring keyboard response, the required response being related to terminal installation,

the terminal, recognizing an appropriate response, configuring itself according to the response prior to entry of the terminal into the entertainment system,

the at least one display screen of characters comprising a first screen generated by the character generator for requesting terminal location information input or terminal identification information input,

the at least one display screen of characters comprising a second screen for indicating acknowledgment of terminal entry into the system by the system manager after input of terminal identification or location information.

27. A two-way interactive entertainment terminal for communicating with a system manager of an entertainment system, the terminal comprising:

a transmission link for communicating via a media with the system manager,

a processor for processing data,

memory associated with the processor,

a character generator, responsive to the processor for generating characters for display on a display screen,

a keypad for inputting information to the terminal, the input information for processing by the processor,

a power input,

a remote control command receiver,

a predetermined control code,

the terminal, responsive to the application of power at the power input, entering an initialization mode,

the processor, during the initialization mode, verifying proper operation of terminal components and software,

the terminal, during the initialization mode, entering an automatic installation mode,

the character generator, responsive to the processor, for generating at least one display screen of characters requiring keyboard response, the required response being related to terminal installation,

the terminal, recognizing an appropriate response, configuring itself according to the response prior to entry of the terminal into the entertainment system,

the at least one display screen of characters generated by the character generator being related to terminal testing during manufacture,

the keyboard being either for remote control of the terminal or directly coupled to the terminal,

the processor recognizing the actuation of at least one predetermined key,

said one predetermined key being one not normally provided on either the remote control keypad or the directly coupled keypad for transmitting a predetermined control code to the remote control command receiver of the terminal,

the predetermined control code being related to terminal testing during manufacture.

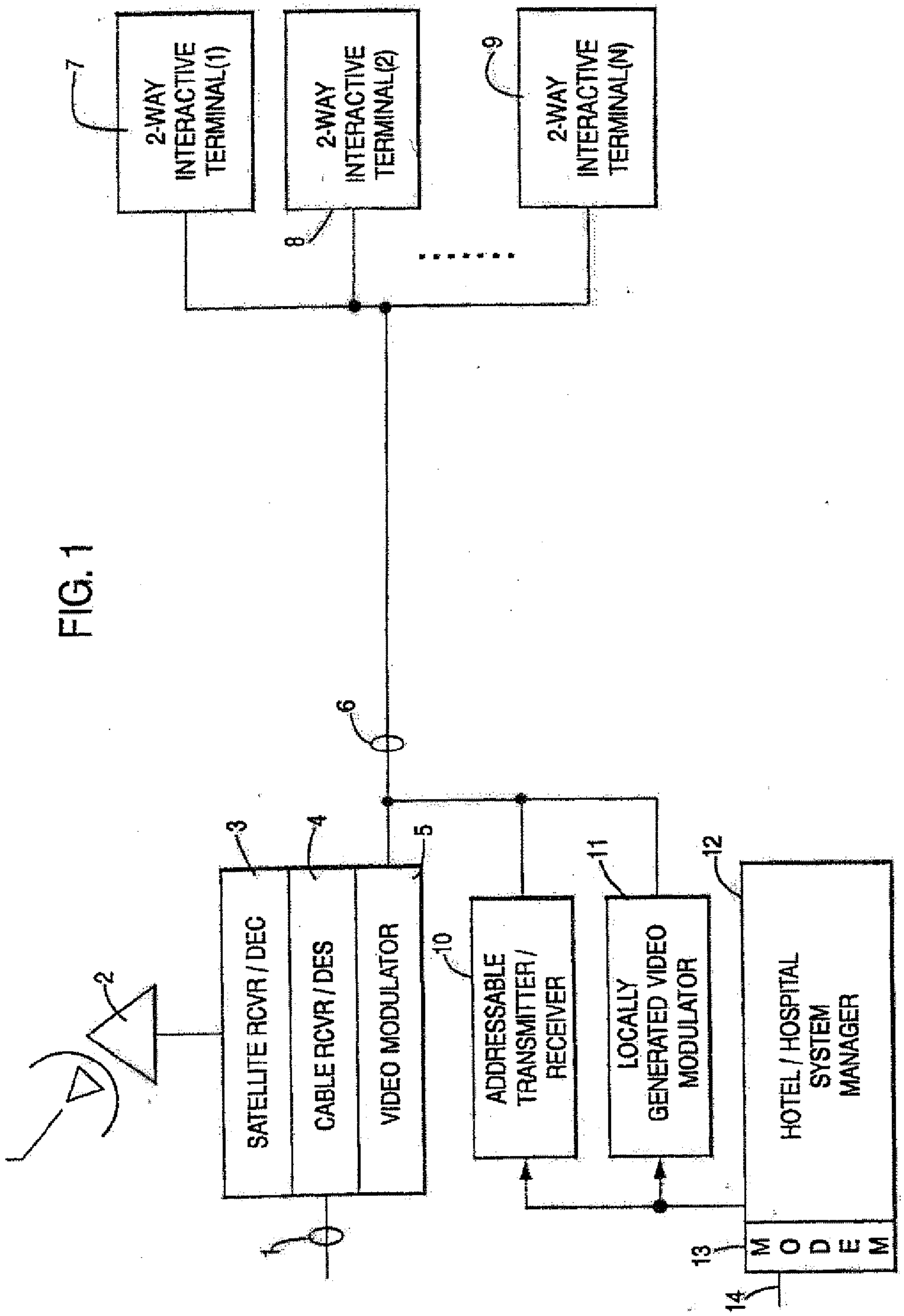

2-WAY INTERACTIVE TERMINAL(1)
7
2-WAY INTERACTIVE TERMINAL(2)
8
2-WAY INTERACTIVE TERMINAL(N)
9
6
2
SATELLITE RCVR / DEC
3
CABLE RCVR / DES
4
VIDEO MODULATOR
5
1
ADDRESSABLE TRANSMITTER / RECEIVER
10
LOCALLY GENERATED VIDEO MODULATOR
11
HOTEL / HOSPITAL SYSTEM MANAGER
12
MODEM
13
14

FIG. 1

FIG. 2

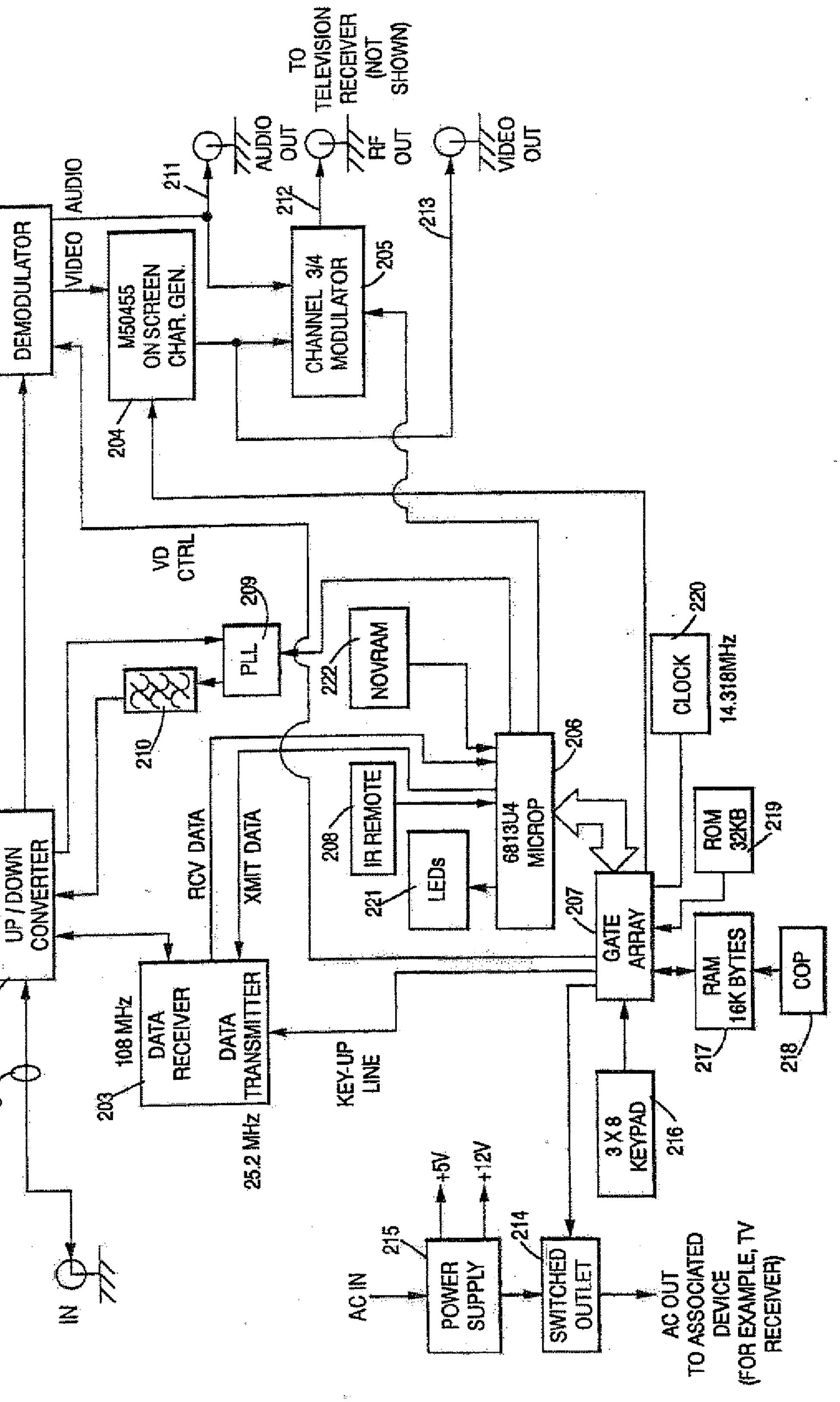
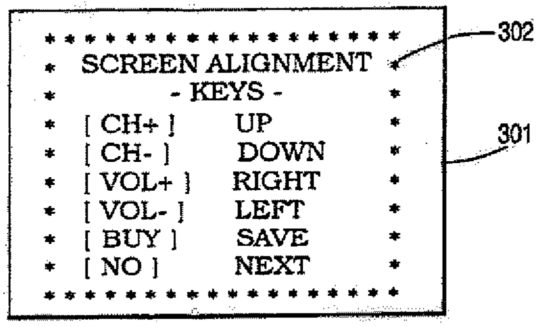
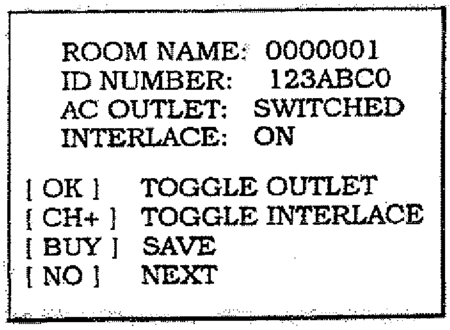

IN
6
201
UP / DOWN CONVERTER
AFC
AGC
202
DEMODULATOR
VIDEO
AUDIO
204
M50455 ON SCREEN CHAR. GEN.
205
CHANNEL 3/4 MODULATOR
211
212
213
AUDIO OUT
RF OUT
VIDEO OUT
TO TELEVISION RECEIVER (NOT SHOWN)
VD CTRL
209
PLL
210
203
108 MHz
DATA RECEIVER
DATA TRANSMITTER
25.2 MHz
RCV DATA
XMIT DATA
KEY-UP LINE
222
NOVRAM
206
6813U4 MICROP
208
IR REMOTE
221
LEDs
220
CLOCK
14.318MHz
219
ROM 32KB
207
GATE ARRAY
217
RAM 16K BYTES
218
COP
216
3 X 8 KEYPAD
214
SWITCHED OUTLET
215
POWER SUPPLY
AC IN
+5V
+12V
AC OUT TO ASSOCIATED DEVICE (FOR EXAMPLE, TV RECEIVER)

FIG. 3(a)



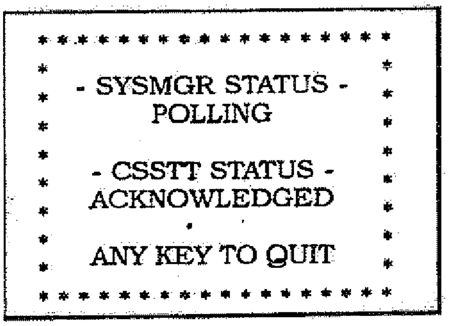
```
*******************
*  SCREEN ALIGNMENT *
*      - KEYS -     *
*  [ CH+ ]   UP     *
*  [ CH- ]   DOWN   *
*  [ VOL+ ]  RIGHT  *
*  [ VOL- ]  LEFT   *
*  [ BUY ]   SAVE   *
*  [ NO ]    NEXT   *
*******************
```

FIG. 3(b)



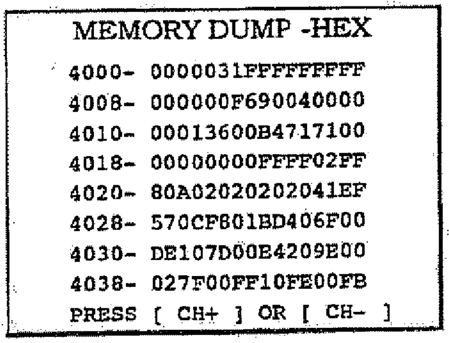
```
ROOM NAME:  0000001
ID NUMBER:   123ABC0
AC OUTLET:  SWITCHED
INTERLACE:  ON

[ OK ]    TOGGLE OUTLET
[ CH+ ]   TOGGLE INTERLACE
[ BUY ]   SAVE
[ NO ]    NEXT
```

FIG. 3(c)



```
*******************
*                 *
* - SYSMGR STATUS - *
*     POLLING     *
*                 *
*  - CSSTT STATUS - *
*  ACKNOWLEDGED   *
*                 *
*  ANY KEY TO QUIT *
*******************
```

FIG. 3(d)



```
MEMORY DUMP -HEX
4000-  0000031FFFFFFFFF
4008-  000000F690040000
4010-  00013600B4717100
4018-  00000000FFFF02FF
4020-  80A02020202041EF
4028-  570CF801BD406F00
4030-  DE107D00E4209E00
4038-  027F00FF10FE00FB
PRESS [ CH+ ] OR [ CH- ]
```

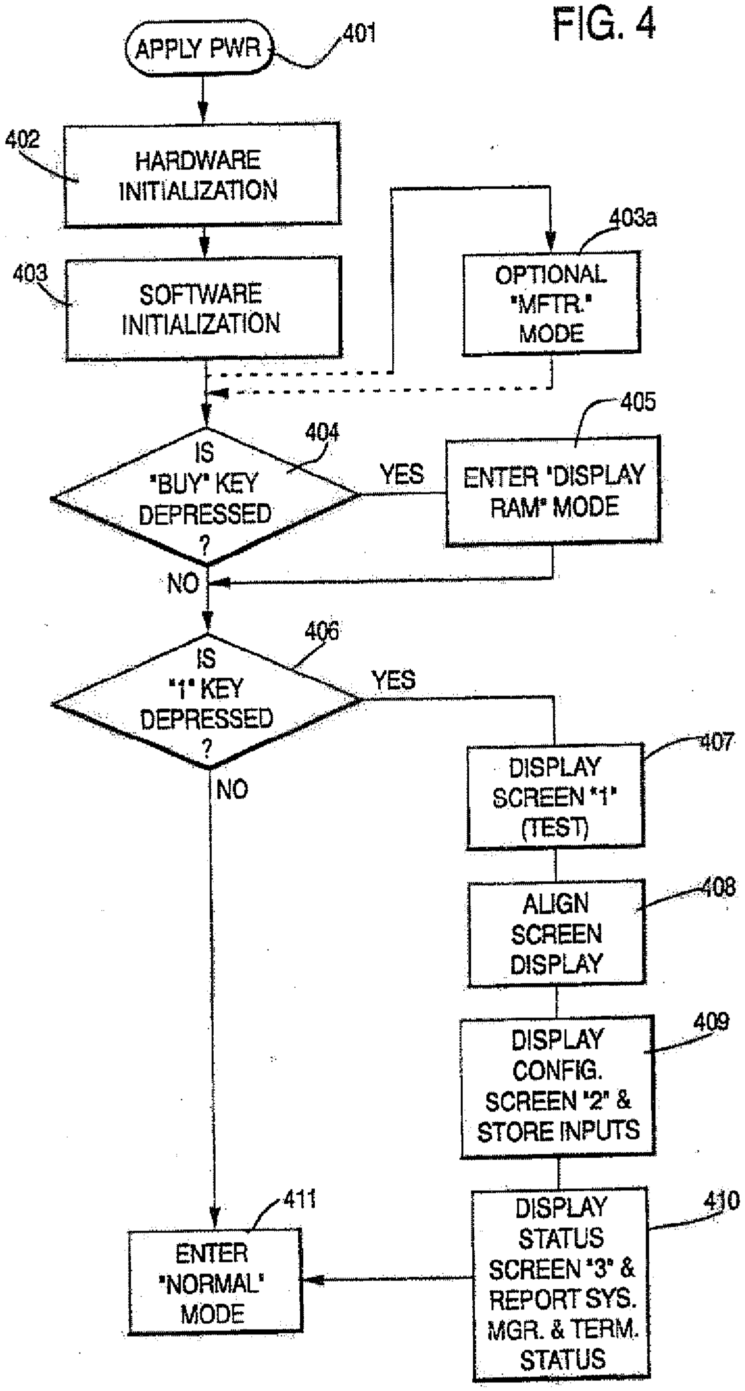
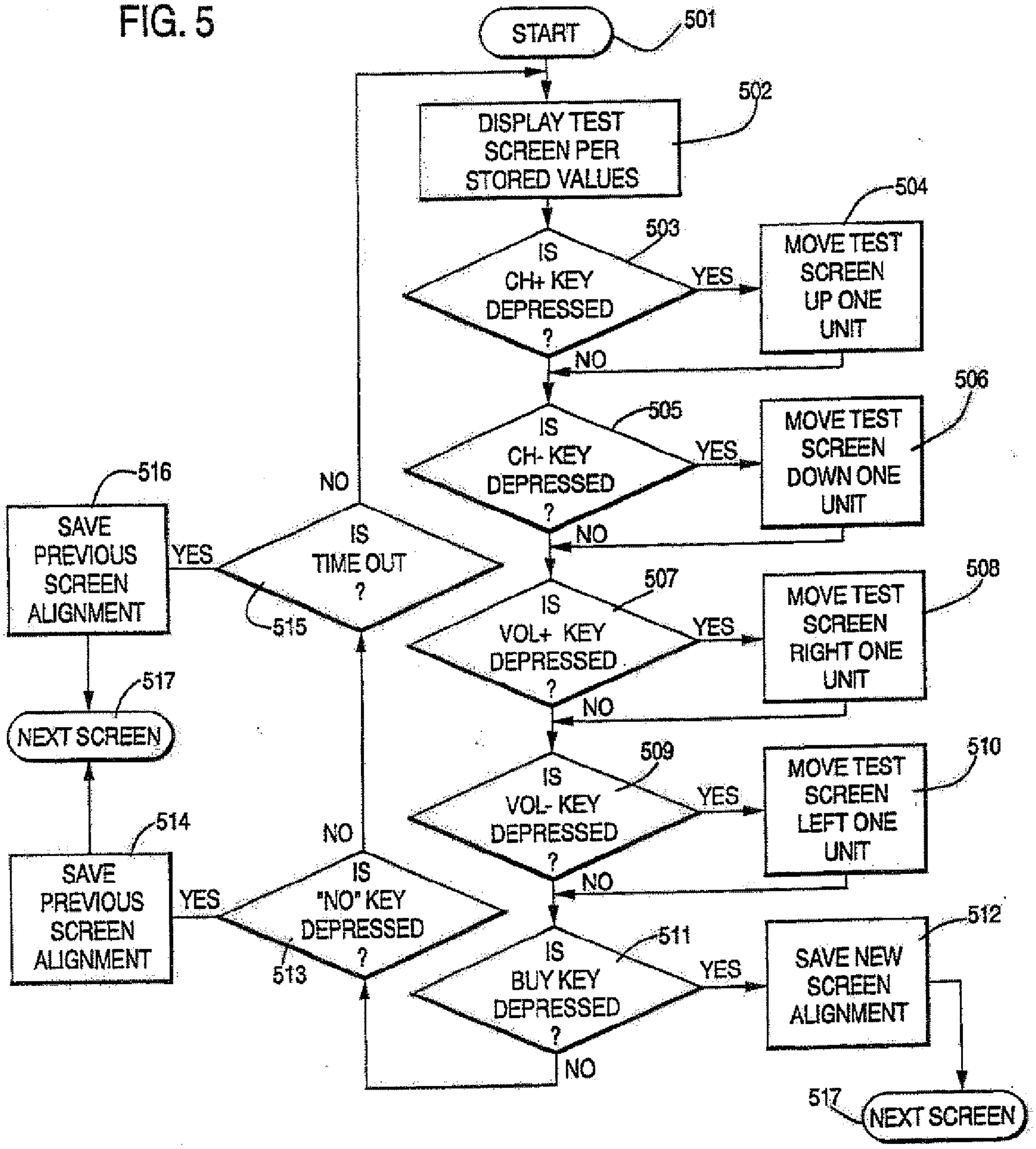

APPLY PWR
401
402
HARDWARE INITIALIZATION
403
SOFTWARE INITIALIZATION
403a
OPTIONAL "MFTR." MODE
404
IS "BUY" KEY DEPRESSED ?
YES
NO
405
ENTER "DISPLAY RAM" MODE
406
IS "1" KEY DEPRESSED ?
YES
NO
407
DISPLAY SCREEN "1" (TEST)
408
ALIGN SCREEN DISPLAY
409
DISPLAY CONFIG. SCREEN "2" & STORE INPUTS
410
DISPLAY STATUS SCREEN "3" & REPORT SYS. MGR. & TERM. STATUS
411
ENTER "NORMAL" MODE

FIG. 4

SUBSTITUTE SHEET

FIG. 5


START
501
DISPLAY TEST SCREEN PER STORED VALUES
502
IS CH+ KEY DEPRESSED ?
503
YES
NO
MOVE TEST SCREEN UP ONE UNIT
504
IS CH- KEY DEPRESSED ?
505
YES
NO
MOVE TEST SCREEN DOWN ONE UNIT
506
IS VOL+ KEY DEPRESSED ?
507
YES
NO
MOVE TEST SCREEN RIGHT ONE UNIT
508
IS VOL- KEY DEPRESSED ?
509
YES
NO
MOVE TEST SCREEN LEFT ONE UNIT
510
IS BUY KEY DEPRESSED ?
511
YES
NO
SAVE NEW SCREEN ALIGNMENT
512
517
NEXT SCREEN
IS "NO" KEY DEPRESSED ?
513
YES
NO
SAVE PREVIOUS SCREEN ALIGNMENT
514
IS TIME OUT ?
515
YES
NO
SAVE PREVIOUS SCREEN ALIGNMENT
516
NEXT SCREEN
517

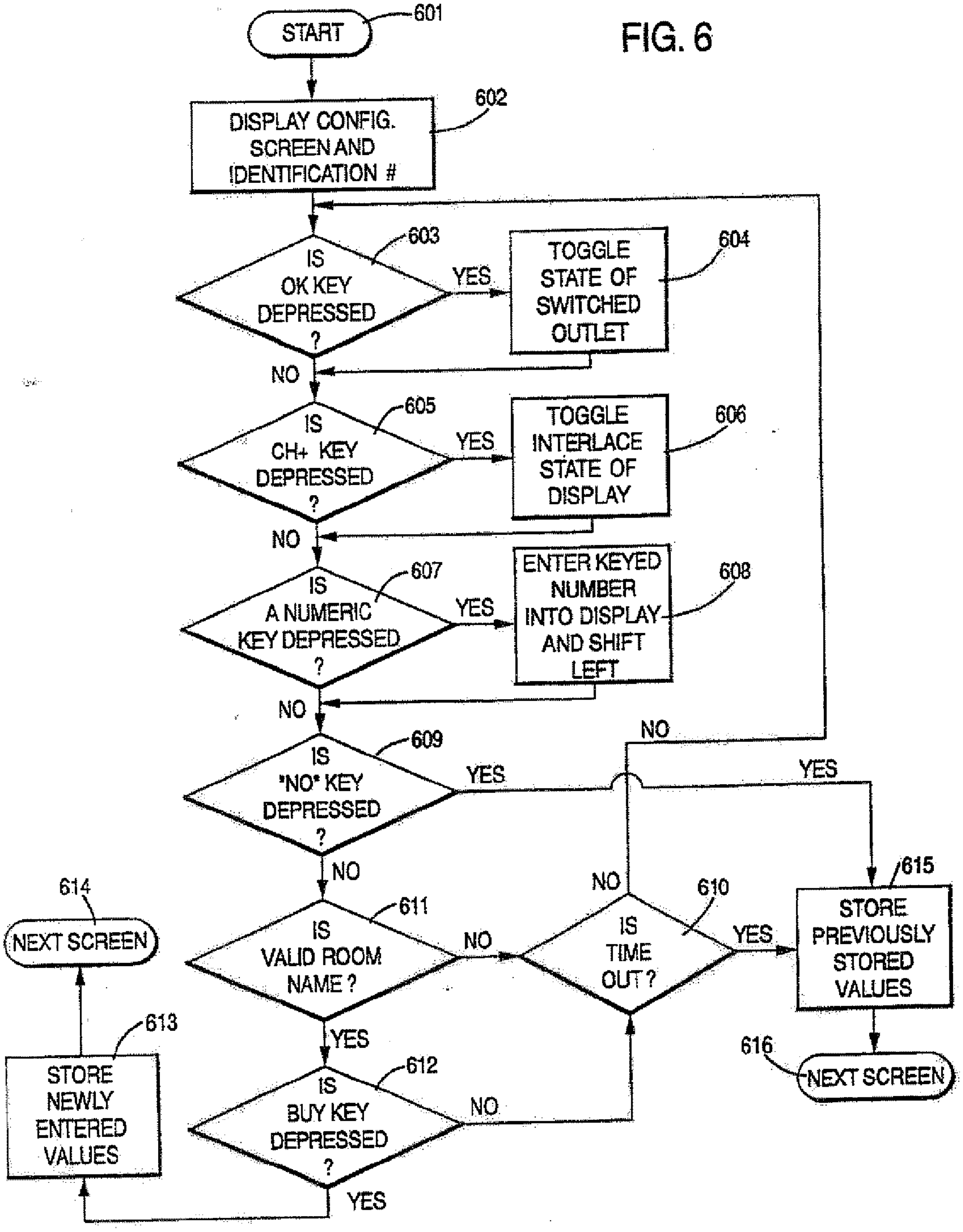
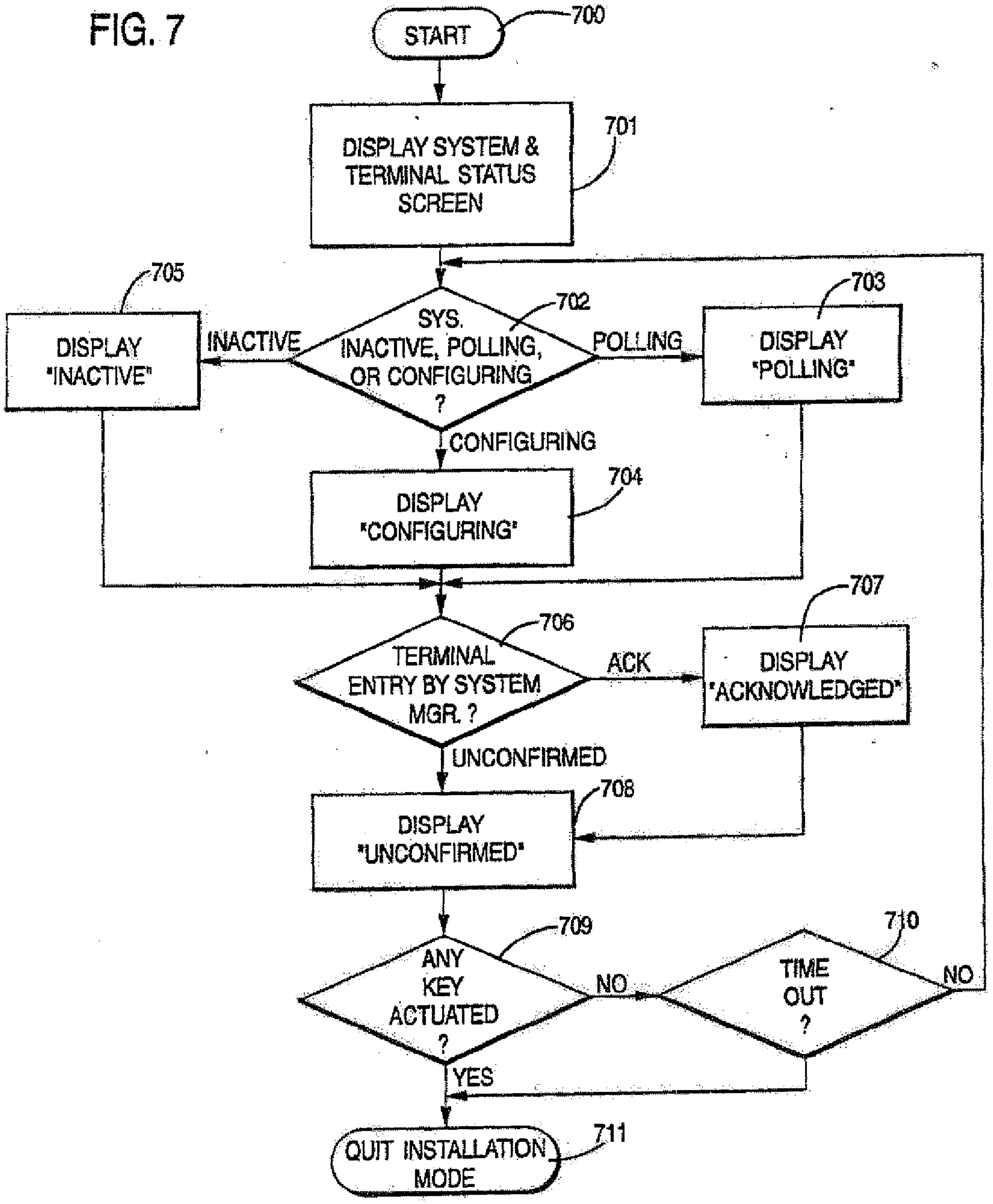

START
601
DISPLAY CONFIG. SCREEN AND IDENTIFICATION #
602
IS OK KEY DEPRESSED ?
603
YES
TOGGLE STATE OF SWITCHED OUTLET
604
NO
IS CH+ KEY DEPRESSED ?
605
YES
TOGGLE INTERLACE STATE OF DISPLAY
606
NO
IS A NUMERIC KEY DEPRESSED ?
607
YES
ENTER KEYED NUMBER INTO DISPLAY AND SHIFT LEFT
608
NO
IS "NO" KEY DEPRESSED ?
609
YES
NO
YES
NO
IS VALID ROOM NAME ?
611
NO
IS TIME OUT ?
610
NO
YES
STORE PREVIOUSLY STORED VALUES
615
NEXT SCREEN
616
YES
IS BUY KEY DEPRESSED ?
612
NO
YES
STORE NEWLY ENTERED VALUES
613
NEXT SCREEN
614

FIG. 6

SUBSTITUTE SHEET

FIG. 7


START
700
DISPLAY SYSTEM & TERMINAL STATUS SCREEN
701
SYS. INACTIVE, POLLING, OR CONFIGURING ?
702
INACTIVE
POLLING
CONFIGURING
DISPLAY "INACTIVE"
705
DISPLAY "POLLING"
703
DISPLAY "CONFIGURING"
704
TERMINAL ENTRY BY SYSTEM MGR. ?
706
ACK
DISPLAY "ACKNOWLEDGED"
707
UNCONFIRMED
DISPLAY "UNCONFIRMED"
708
ANY KEY ACTUATED ?
709
NO
TIME OUT ?
710
NO
YES
QUIT INSTALLATION MODE
711

INTERNATIONAL SEARCH REPORT

International Application No PCT/US 89/05657

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: H 04 N 7/173

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	H 04 N, H 04 L, H 04 H

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No.[13]
A	US, A, 4792972 (A.M. COOK, JR.) 20 December 1988, see the whole document --	1-24
A	DE, A1, 3036201 (PIONEER ELECTRONIC CORP.) 16 April 1981, see the whole document --	1-24
A	DE, A1, 3036198 (PIONEER ELECTRONIC CORP.) 16 April 1981, see the whole document --	1-24

----

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search 25th April 1990	Date of Mailing of this International Search Report 08. 05. 90
International Searching Authority EUROPEAN PATENT OFFICE	Signature of Authorized Officer MISS D. S. KOWALCZYK

Form PCT/ISA/210 (second sheet) (January 1985)

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/US 89/05657

SA 33761

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on 30/03/90
The European Patent office is in no way liable for theseparticulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4792972	20/12/88	AU-D- 7787487 EP-A- 0321476 WO-A- 88/01465	08/03/88 28/06/89 25/02/88
DE-A1- 3036201	16/04/81	FR-A-B- 2466159 GB-A-B- 2062422 JP-A- 56047182	27/03/81 20/05/81 28/04/81
DE-A1- 3036198	16/04/81	FR-A-B- 2466157 GB-A-B- 2063027 JP-A- 56047178	27/03/81 28/05/81 28/04/81

For more details about this annex : see Official Journal of the European patent Office, No. 12/82